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A Study of the Achievement of First Grade Pupils in Pronouncing Words Presented in Isolation in Capital and Lower Case Orthography.

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A total of 339 pupils from 99 first-grade classes were tested over a 2-year period to determine whether they could pronounce words presented singly, out of context, equally well when they were printed with all capital letters, first letter only capitalized, or all lower case orthography. The Isolated Word Recognition test of the Standard Reading Inventory was used. The scores were significantly in favor of higher achievement on words presented in all lower case orthography. The findings supported the contention that configuration may be important in recognizing words. This support was inferential only in that the data did not refute the idea of configuration; a refutation would have been made if performance in both forms had been equal. The findings gave a mixed interpretation for the usefulness of modified or augmented alphabetic systems, since the moving from lower case orthography to capital orthography might be viewed as a problem of transfer. There was an average achievement difference of about 25 percent, favoring better performance with lower case orthography. References and tables are included. (Author/MD)

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# A STUDY OF THE ACHIEVEMENT OF FIRST GRADE PUPILS IN PRONOUNCING WORDS PRESENTED IN ISOLATION IN CAPITAL AND LOWER CASE ORTHOGRAPHY

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## Purpose of the Study

The purpose of this study was to investigate the achievement of first grade pupils in pronouncing words presented in isolation when the words were presented in lower case and capital letter orthography, and when only the initial letter of each word was capitalized.

## Rationale

There are many statements in professional books stating that young children use configuration as one aid in recognizing words. Words printed in capital and lower case forms have dissimilar configurations. Capital letter word forms might be considered as having no configurations

other than length. Proponents of simplified orthography have stated that the need to learn two forms of the alphabet, capital and lower case, is wasteful and confuses the young child. The investigators presumed that if young children recognized words equally well in both capital and lower case forms children do not depend much upon configuration to recognize words and the proponents of simplified orthography are wrong in their statements about confusion and waste.

## Population

There were 51 first grade classes in the Muncie Indiana Community School District in September 1967. Forty-seven of the fifty-one first grade teachers volunteered to participate. One child from each of the forty-seven classes was randomly selected each month for a period of five months, December 1967, and January, February, March, and April 1968. Two hundred firty-five children were tested.

There were 52 first grade classes in the Muncie Indiana Community School District in September 1968. All fifty-two first grade teachers volunteered to participate during the 1968-69 school year. Two children were chosen randomly from each class for a single testing in February 1969.

## Testing and Procedures

Each child was tested individually by his regular classroom teacher. Children were tested using the isolated word recognition test of the Standard Reading Inventory (1). Each child took form A and form B.

In the 1967-68 school year one form was administered in capital letters and one form was administered in lower case form. Half the children took form A in capitals and form B in lower case; half took

form A in lower case and form B in capitals. Half of the children took the capital letter form first equally divided between forms A and B followed by the lower case test.

In the 1969 testing each child was administered both forms A and B of the Isolated Word Recognition Test of the S.R.I. and a test of alphabet recognition. Fifty-two of the pupils were tested as in the previous year, replicating the 1967-68 study except for the time of test administration. Fifty-two of the pupils were tested as in 1967-68 except that one form of the test was entirely in lower case letters and the second form was with the first letter of each word capitalized and the remainder of each word in lower case orthography. It was planned to alternate the forms and the orthography so that an equal number of pupils would be tested using form A or B first, and using the capital letter or all lower case orthography first. Inadvertently the tests were administered with a 27-25 split. It is felt that this deviation from plan does not effect the results.

The alphabet knowledge test was constructed by randomly ordering the twenty-six letters of the alphabet. The letters were shown individually to each child, requesting that he name the letters. The random ordering was done twice, once for lower case orthography and once for capital. Each child was given both the capital and lower case forms.

## Statistics and Results

These statistics used were the t-test for uncorrelated scores and the t-test for correlated scores. For the grouping of the data and the analyses see tables I through VIII. The results of the alphabet recognition test are in table IX.

The monthly results for the 1967-68 testings were consistent with the total results so that only the total results are reported. It was felt that there might be a shift in performance as the pupils progressed through the school year. No such shift was apparent except that the pupils knew more words each month in both capital and lower case form.

All of the differences favored greater pronouncing ability when the words appeared in lower case orthography. These differences were much more evident and, with one exception, statistically significant ($p<0.01$) when each pupil served as his own control. This is reflected in the t-scores for correlated scores in Tables III and VIII. There was a wide range of performance running from zero (no words recognized) to 115 (all words recognized). This range is reflected in the standard deviations in Tables I, IV, and VI. The distribution of scores was skewed toward the higher levels.

The 1967-68 testings were done during the first week of each month. The 1969 February testing was done at the end of the month, although it was planned for the beginning of February. The 1969 average scores were slightly higher than the averages for the 1967-68. This finding seems consistent with the testing times, indicating that the groups tested during the two years were similar.

The scores were consistent in showing that the best achievement was when the words were in all lower case orthography, next best when only the first letter was capitalized, and poorest when the words were all capitalized. Since the test of alphabet knowledge indicated a small but significant better knowledge of capital letters, it would seem that

knowledge or lack of knowledge of the individual letters did not cause the differences. It should be noted that the children had unlimited time as they responded to both the words and letters. They may have responded to one form of orthography faster than to the other; no attempt was made to measure this.

There were some children who scored higher when pronouncing from the capital letter forms of the test. However, most scored better on the lower case form; 258 made higher scores when reading from the lower case forms, 27 made the same score on both forms, and 54 made better scores when reading from capital letter forms. Seventeen of the fifty-four scores were when the first letter only was capitalized.

These differences may be related to the instructional method or methods which were used in the instruction. Children who received instruction under a system of heavy synthetic phonics might be expected to achieve equally well regardless of orthography, whereas children who received instruction which de-emphasized synthetic phonics and had a greater reliance upon sight recognition might be expected to achieve better with lower case letters.

The data support the notion that children are more likely to recognize the familiar than the unfamiliar; the children had met the lower case forms most often in their reading, they would have met the first letter capital next in frequency, and they would have met the all capital letter form very seldom.

The data would also indicate that there is something unique in each word which acts as a cue or cues in recognition. This cue might be configuration, but this study does not indicate that the recognition cue was configuration any more than it indicates that the cue might have been something internal to the letters or their sequence.

The amount of difficulty may be viewed as a percentage. There was an average loss of approximately 25% in shifting from lower case to capital letter orthography. The loss was more pronounced among the poorer achieving students than among those who achieved well above average. This finding would be consistent with the observations and data reported from studies of achievement when children taught to read from some augmented alphabet or an almost entirely new alphabetic orthography show a loss in achievement when transferring.

TABLE I

Results Achieved by First Grade Pupils on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in Dec. 1967, Jan., Feb., March, & April 1968 Testings

| Form | Orthography | N | Mean | S.D. |
|---|---|---|---|---|
| A | all lower case | 118 | 34.80 | 25.02 |
| B | all lower case | 117 | 36.19 | 29.14 |
| A | all capital | 117 | 28.30 | 26.71 |
| B | all capital | 118 | 26.47 | 25.74 |

TABLE II

t-Score Results Between Mean Scores Achieved on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in Dec. 1967, Jan., Feb., March, & April 1968 Testings

| Orthography of Test and Test Form | t-Score | Approximate level of significance |
|---|---|---|
| lower case A vs. lower case B | 0.392 | 0.70 |
| lower case A vs. capital A | 1.924 | 0.06 |
| lower case B vs. capital B | 2.708 | 0.01 |
| capital B vs. capital A | 0.533 | 0.60 |

TABLE III

Differences in Scores Achieved by First Grade Pupils on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in Dec. 1967, Jan., Feb., March, & April 1968 Testings

| Scores Being Compared and Test Form | N | Mean | S.D. | S.E. | t-Score | Approximate level of Significance |
|---|---|---|---|---|---|---|
| lower case A minus capital B | 118 | 8.32 | 11.00 | 1.07 | 7.79 | <0.0001 |
| lower case B minus capital A | 117 | 7.89 | 11.56 | 1.02 | 7.72 | <0.0001 |

TABLE IV

Results Achieved by First Grade Pupils on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in February 1969 (Replication Study)

| Form | Orthography | N | Mean | S.D. |
|---|---|---|---|---|
| A | all lower case | 25 | 41.840 | 26.388 |
| B | all capital | 25 | 32.840 | 28.577 |
| A | all capital | 27 | 32.037 | 25.390 |
| B | all lower case | 27 | 39.037 | 24.576 |

TABLE V

t-Score Results Between Mean Scores Achieved on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in February 1969 (Replication Study)

| Orthography of Test and Test Form | t-Score | Approximate level of significance |
|---|---|---|
| lower case A vs. lower case B | 0.397 | 0.70 |
| lower case A vs. capital A | 1.365 | 0.17 |
| lower case B vs. capital B | 0.840 | 0.40 |
| capital B vs. capital A | 0.107 | 0.92 |

TABLE VI

Results Achieved by First Grade Pupils on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in Feb. 1969 Testing

| Form | Orthography | N | Mean | S.D. |
|---|---|---|---|---|
| A | all lower case | 25 | 35.640 | 20.475 |
| B | first letter capitalized | 25 | 31.360 | 18.761 |
| A | first letter capitalized | 27 | 29.926 | 21.456 |
| B | all lower case | 27 | 29.815 | 25.505 |

TABLE VII

t-Score Results Between Mean Scores Achieved on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in Feb. 1969 Testing

| Orthography of Test and Test Form | t-Score | Approximate level of significance |
|---|---|---|
| lower case A vs. lower case B | 1.024 | 0.31 |
| lower case A vs. first letter capital A | 0.981 | 0.33 |
| lower case B vs. first letter capital B | 0.283 | 0.78 |
| first letter capital B vs. first letter capital A | 0.256 | 0.80 |

TABLE VIII

Differences in Scores Achieved by First Grade Pupils on the Standard Reading Inventory Sub-Test of Word Pronouncing in Isolation in Feb. 1969 Testing

| Scores Being Compared and Test Form | N | Mean | S.D. | S.E. | t-Score | Approximate level of significance |
|---|---|---|---|---|---|---|
| lower case A minus capital B | 27 | 7.000 | 8.572 | 1.681 | 4.164 | $<0.0001$ |
| lower case B minus capital A | 25 | 9.000 | 7.746 | 1.581 | 5.692 | $<0.0001$ |
| lower case A minus first letter capital B | 27 | 0.111 | 4.573 | 0.897 | 0.124 | 0.45 |
| lower case B minus first letter capital A | 25 | 4.280 | 7.231 | 1.476 | 2.900 | $<0.005$ |

TABLE IX

Differences in Achievement in Naming Capital and Lower Case Letters of the Alphabet

| N | Capital Minus Lower Case | | S.E. | t-Score | Approximate level of significance |
|---|---|---|---|---|---|
| | Range | Mean difference | | | |
| 104 | -6 to +5 | [a]0.6250 | 0.1447 | 4.3184 | <0.0008 |

[a]All but four scores fell between minus 2 and plus 3.

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## Summary and Conclusion

Three hundred and thirty-nine first grade pupils from ninety-nine first grade classes were tested over a two-year period to determine if they could pronounce words presented singly, out of context, equally well when printed in all capital letters or first letter only capitalized and all lower case orthography. The Isolated Word Recognition test of the Standard Reading Inventory was used. The scores were significantly in favor of higher achievement on words presented in all lower case orthography. The findings support the contention that configuration may be important in recognizing words; this support is inferential only in that the data does not refute the idea of configuration; a refutation would have been made if performance in both forms was equal. The findings give a mixed interpretation for the usefulness of modified or augmented alphabetic systems since the moving from lower case orthography to capital orthography might be viewed as a problem of transfer. There was an average difference of achievement of about 25% as children favoring better performance with lower case orthography.

## Reference

1. McCracken, Robert A. Standard Reading Inventory. Bellingham, Washington: Pioneer Printing Company, Publisher, 1966.